DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

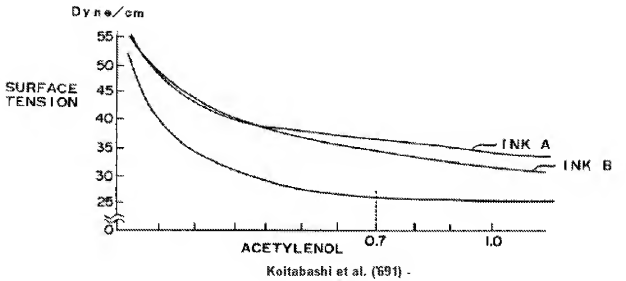
3. **Claims 1-10** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Koitabashi et al.** (US 6,612,691 B1) in view of **Hirose et al.** (US 5,591,514 A) with reference to the Institute of Electrical and Electronics Engineers (IEEE) and The American Society for Testing and Materials (ASTM): Dictionary.com, Definition of Room Temperature: An indoor temperature of from 20 to 25°C (68 to 77°F) [**Room Temperature**].

a. As related to independent **claim 1,** Koitabashi et al. teaches an ink-jet recording method (Koitabashi et al. – Title) in which recording is executed by discharging inks of a plurality of colors from a discharge opening as droplets of ink to be attached onto a recording material (Koitabashi et al. – Abstract). This

method comprises discharging successive ink droplets of a first color and a second color with an interval of 50msec to 200 msec therebetween (Koitabashi et al. – Description, Column 3 lines 16-20, Column 12, Lines 13-34, Column 19 lines 62-66 and Column 29, Lines 30-45; ink ejection interval is 50 msec for recording with short interval between split ink ejection and 1.5 sec = 1500 msec for long interval between ink ejections), using inks having a surface tension of 25 to 45 mN/m [i.e. dyne/cm] at 23° C [i.e. from less than 35 to more than 40 at room temperature (Heater at 0V)] and an ink solvent containing water for each of the inks (Koitabashi et al. – Description, Column 11, Lines 5-16 & Column 7, Lines 40-50 and Table 1 & Figure 47, both shown below).

Koitabashi et al. ('691) - TABLE 1

	Ka value ($ml/m^2 \cdot msec^{1/2}$)	Acetylenol content (%)	Surface tension (dyn/cm)
Topping type (non-penetrative) ink	–1.0	0.0–0.2	40–
Semi-penetrative ink	1.0–5.0	0.2–0.7	35–40
High-penetrative ink	5.0–	0.7–	–35



Koitabashi et al. ('691) -

FIG. 47

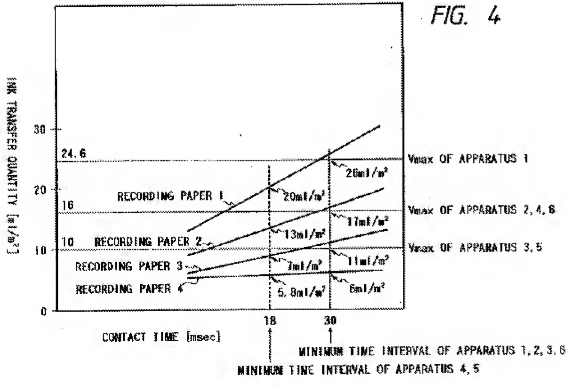
b. Continuing with **claim 1,** while Koitabashi et al. teaches the method as detailed above and continues to teach using a recording material having an ink absorption amount in 100mS of 15mL/m^2 or more [i.e. 10-50 mL/m^2 for Semi-penetrative ink and 50+ mL/m^2 for high-penetrative ink] (Koitabashi et al. – Title; Abstract; Summary, Column 3, Lines 1-20; Detailed Description, Column 10, Line 64 – Column 11, Line 36; Table 1; and Figure 47, both shown above).

Hirose et al. teaches an ink-jet recording method [i.e. process] which discharges successive ink droplets of a first color and second color with an interval of 50msec to 200msec (Hirose et al. – Description, Column 7 lines 24-65; Column 13, Lines 1-15), using ink with a surface tension of 25 to 45 mN/m [i.e. dyne/cm] at room temperature (Hirose et al. – Description, Column 5, Lines 30-45, particularly notice Lines 35-40), and an ink solvent containing water (Hirose et al. – Description, Column 9, Lines 20 and following). Hirose et al. continues to

further elaborate on each of the teachings of Koitabashi et al. to include further detailing the use of recording material having ink absorption amount in 100mS of 15mL/m^2 or more [i.e. 20-57 mL/m^2 for different recording paper] (Hirose et al. – Figure 4, shown below). Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to combine the details of Koitabashi et al. with the teachings of Hirose et al. to provide an ink-jet recording process that overcomes the downfalls and shortcomings of the previously known methods.

Hirose et al. -

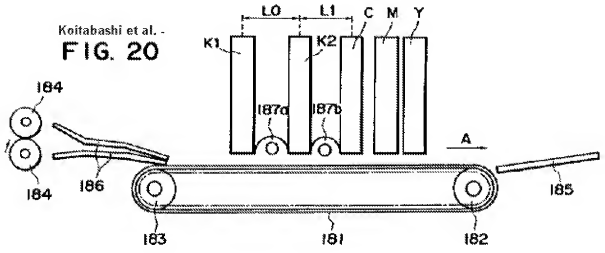
FIG. 4



c. As related to dependent **claim 2,** the combination of Koitabashi et al. and Hirose et al. remains as applied above and continues to teach discharging the

inks using a line head (Koitabashi et al. – Description, Column 21, Line 39 – Column 22, Line 67 and Figure 20, shown below).

Koitabashi et al. -
FIG. 20



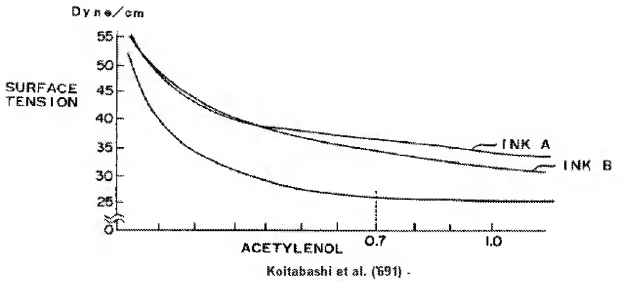
d. As related to dependent **claims 3, 7, & 9,** the combination of Koitabashi et al. and Hirose et al. remains as applied above and continues to teach the recording material has an ink absorption about in 100mS between 15mL/m^2 and 99 mL/m^2 [i.e. 10-50 mL/m^2 for Semi-penetrative ink and 50+ mL/m^2 for high-penetrative ink] and further an ink absorption amount in 100mS between 15mL/m^2 {18mL/m^2}and 40 mL/m^2 [i.e. 10-50 mL/m^2 for Semi-penetrative ink] (Koitabashi et al. – Title; Abstract; Summary, Column 3, Lines 1-20; Detailed Description, Column 10, Line 64 – Column 11, Line 36; Table 1; and Figure 47, both shown previously) [i.e. 20-57 mL/m^2 for different recording paper] (Hirose et al. – Figure 4, shown previously).

e. As related to independent **claim 4,** Koitabashi et al. teaches an ink-jet printer (Koitabashi et al. – Title) in which recording is executed by discharging

inks of a plurality of colors from a discharge opening as droplets of ink to be attached onto a recording material (Koitabashi et al. – Abstract). This printer also has an interval between a discharge of a droplet of an ink of a first color and a discharge of a droplet of an ink of a second color is 50msec to 200 mS (Koitabashi et al. – Description, Column 3 lines 16-20, Column 12, Lines 13-34 column 19 lines 62-66 and Column 29, Lines 30-45; ink ejection interval is 50 msec for recording with short interval between split ink ejection and 1.5 sec = 1500 msec for long interval between ink ejections), inks having a surface tension of 25 to 45 mN/m [i.e. dyne/cm] at 23° C [i.e. from less than 35 to more than 40 at room temperature (Heater at 0V)] and an ink solvent containing water for each of the inks of each color (Koitabashi et al. – Description, Column 11, Lines 5-16 & Column 7, Lines 40-50, Column 18, Lines 42-54 and Table 1 & Figure 47, both shown below).

Koitabashi et al. ('691) - TABLE 1

	Ka value ($ml/m^2 \cdot msec^{1/2}$)	Acetylenol content (%)	Surface tension (dyn/cm)
Topping type (non-penetrative) ink	–1.0	0.0–0.2	40–
Semi-penetrative ink	1.0–5.0	0.2–0.7	35–40
High-penetrative ink	5.0–	0.7–	–35



Koitabashi et al. ('691) -

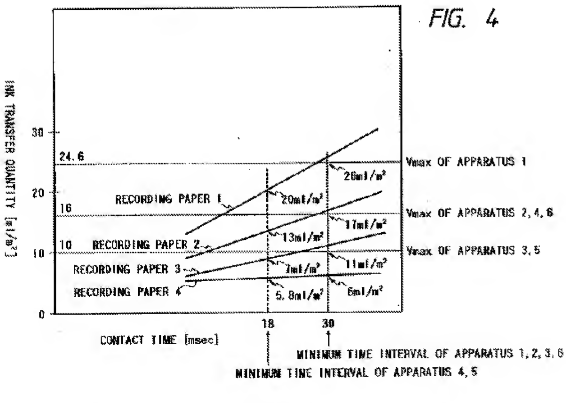
FIG. 47

f. Continuing with **claim 4,** while Koitabashi et al. teaches the method as detailed above and continues to teach a recording material having an ink absorption amount in 100mS of 15mL/m^2 or more [i.e. 10-50 mL/m^2 for Semi-penetrative ink and 50+ mL/m^2 for high-penetrative ink] (Koitabashi et al. – Title; Abstract; Summary, Column 3, Lines 1-20; Detailed Description, Column 10, Line 64 – Column 11, Line 36; Table 1; and Figure 47, both shown above), Hirose et al. teaches an ink-jet printer [i.e. recorder] which discharges inks of a first color and second color at an interval of 200msec or less [i.e. 18msec or 30 msec] (Hirose et al. – Description, Column 13, Lines 1-15), an ink with a surface tension of 25 to 45 mN/m [i.e. dyne/cm] at room temperature (Hirose et al. – Description, Column 5, Lines 30-45, particularly notice Lines 35-40), and an ink solvent containing water (Hirose et al. – Description, Column 9, Lines 20 and following). Hirose et al. continues to further elaborate on each of the teachings of Koitabashi

et al. to include further detailing a recording material having ink absorption amount in 100mS of 15mL/m^2 or more [i.e. 20-57 mL/m^2 for different recording paper] (Hirose et al. – Figure 4, shown below). Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to combine the details of Koitabashi et al. with the teachings of Hirose et al. to provide an ink-jet printer that overcomes the downfalls and shortcomings of the previously known devices.

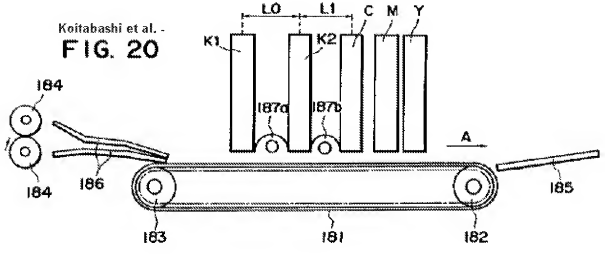
Hirose et al. -

FIG. 4



g. As related to dependent **claim 5,** the combination of Koitabashi et al. and Hirose et al. remains as applied above and continues to teach the printer is a line

head (Koitabashi et al. – Description, Column 21, Line 39 – Column 22, Line 67 and Figure 20, shown below).



h. As related to dependent **claim 6, 8, & 10,** the combination of Koitabashi et al. and Hirose et al. remains as applied above and continues to teach the recording material has an ink absorption about in 100mS between 15mL/m^2 and 99 mL/m^2 [i.e. 10-50 mL/m^2 for Semi-penetrative ink and 50+ mL/m^2 for high-penetrative ink] and further an ink absorption amount in 100mS between 15mL/m^2 {18mL/m^2}and 40 mL/m^2 [i.e. 10-50 mL/m^2 for Semi-penetrative ink] (Koitabashi et al. – Title; Abstract; Summary, Column 3, Lines 1-20; Detailed Description, Column 10, Line 64 – Column 11, Line 36; Table 1; and Figure 47, both shown previously) [i.e. 20-57 mL/m^2 for different recording paper] (Hirose et al. – Figure 4, shown previously).

4. **Claims 11-16** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Koitabashi et al.** (US 6,612,691 B1) and **Hirose et al.** (US 5,591,514 A) while

referencing **Room Temperature** as applied to **claims 1 & 4**, above and further in view of **Koitabashi et al.** (US 2002/0097290 A1) and **Sakaki et al.** (US 6,174,056 B1).

a. As related to dependent **claims 11,** and further dependent **claim 12,** as well as dependent **claims 15, & 16,** the combination of Koitabashi et al. and Hirose et al. teaches the limitations of **claims 1 & 4** for the reasons above and continues to teach adding an organic solvent to the ink solvent (Hirose et al. – Description, Column 9, Lines 20-26). The combination ***does not*** specifically teach the organic solvent's percent of mass. ***However,*** both Koitabashi et al. ('290) and Sakaki et al. teach the use of similar inks with similar characteristics to include an ink solvent containing water and an organic solvent (Koitabashi et al. ('290) – Title; Abstract; Detailed Description, Page 14, Paragraph 207 and Page 16, Paragraph 229 and Sakaki et al. – Title; Abstract; Description, Column 6, Lines 1-65) these organic solvents make up 5-50% as well as 10-35% of the total mass of the inks (Koitabashi et al. ('290) – Detailed Description, Page 16, Paragraph 229 and Sakaki et al. – Ink compositions table, shown below).

(Ink compositions) Sakaki et al. -

dyes	4 parts
glycerol	6 parts
thiodiglycol	6 parts
urea	6 parts
acetylene glycol (Surfynol 104, a product from Nisshin Kagaku)	x parts
water	76−x parts

dyes:

Y:	C.I. Direct Yellow #86	
M:	C.I. Acid Red #23	
C:	C.I. Direct Blue #199	
Bk:	C.I. Food Black #2	
Ink A:	x = 0.3, surface tension:	45 dyne/cm
Ink B:	x = 1, surface tension:	39 dyne/cm
Ink C:	x = 3, surface tension:	26 dyne/cm
Ink D:	x = 10, surface tension:	21 dyne/cm
Ink E:	x = 2, surface tension:	31 dyne/cm,

Acetylene alcohol (Surfynol 61, a product from Nisshin Kagaku) was used in place of acetylene glycol.

Ink F: x = 1.5, surface tension: 33 dyne/cm

Polyoxyethylene nonyl phenyl ether (Noigen EA-5, a product from Dellchi Kagaku) was used in place of acetylene glycol.

Ink G:	acetylene glycol x = 0.4, surface tension:	42 dyne/cm
Ink H:	acetylene glycol x = 0.5, surface tension:	38 dyne/cm

b. As related to dependent **claims 13 & 14,** the combination of Koitabashi et al. and Hirose et al. teaches the limitations of **claim 1** for the reasons above and continues to adding additional materials, fluids or components to the composition to improve the characteristics thereof including adjusting the surface tension of each of said inks by adding a nonionic surfactant (Koitabashi et al. – Description, Column 7, Lines 4—50). The combination ***does not*** specifically teach every single possible component that can be added as claimed by the present invention, ***However,*** Koitabashi et al. ('290) clearly teaches adding additional materials, fluids or components to the composition to improve the characteristics thereof including adding a cationic surfactant or an ampholytic surfactant (Koitabashi et al. ('290) – Detailed Description – Page 16, Paragraphs 227-228) as well as adding an amine (Koitabashi et al. ('290) - Detailed Description, Page 14, Paragraph 206 – Page 15, Paragraph 207). ***Meanwhile,*** Sakaki et al. further

continues the teachings to include adding additional materials, fluids or components to the composition to improve the characteristics thereof including adding any of a variety of the claimed surfactants as well as pH adjusters, amines, preservatives, and ultraviolet absorbers (Sakaki et al. – Column 4, Lines 10-16 & Lines 24-55 and Column 6, Lines 1-65) to each of the inks at some point in the recording process or preparation therefore.

Given the same field of endeavor, specifically an ink-jet printer which merely discharges ink and uses recording material, it is apparent that one of ordinary skill in the art at the time the invention was made would have been motivated to combine the method and apparatus of ink-jet recording using any of a variety of available inks as taught by the combination of Koitabashi et al. and Hirose et al. teaches with the specific ink-jet recording ink that was readily available to one of ordinary skill in the art at the time of the invention, with the further detailed depiction of the ink in use as taught by both Koitabashi et al. ('290) and Sakaki et al. in an effort to use the most effective ink available as an improvement over the existing options at the time particularly in super high speed printers with full line head printing capabilities (Koitabashi et al. ('290) – Detailed Description, Paragraph 42), while merely using that which was available to one of ordinary skill in the art at the time of the invention, in this case to the same inventor [i.e. Koitabashi et al.].

Response to Arguments

Applicant's arguments filed 12/8/2010 have been fully considered but they are not persuasive.

1. In response to applicants arguments regarding that Koitabashi or Hirose fail to disclose discharging inks of a first color and a second color with an interval of 50 msec to 200 msec therebetween. However, Koitabashi clearly teaches having a discharge interval of 50msec for testing the recording process having a short interval between split ejections and 1.5 seconds for long interval between ejections. Since Koitabashi teaches at least 50 msec, which overlaps with the claimed range of 50 msec to 200 msec. Furthermore it has been held that in the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a *prima facie* case of obviousness exists. *In re Wertheim*, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990).

2. Applicant further argues that that Koitabashi discloses discharging two ink droplets of the same color and Hoishe discloses an ink shoot time for inks of a different color being 18 msec. Koitabashi teaches depositing droplets of different colors after the deposition of black ink (column 18 lines 47-50). Sine the ejection interval between droplets is set to be short (i.e. 50 msec) it would be obvious that the color ink droplets that are deposited are also ejected in that time interval. Koitabashi further discloses that the color ink droplets are ejected during second scanning movement (column 19 line 66 to column 20 line 2) during long interval between split ink ejections (i.e. 1.5 seconds). As to the arguments that Hoishe discloses an ink shoot time for inks of a different color being 18 msec, the examiner would like to point out that the disclosed shoot time of 18 msec is an example and is not limited to that. Hoishe teaches adjusting shoot time interval and provides examples with a longer shoot time (i.e. 30 msec). Hoishe in no

way limits the ejection shoot time to 18 msec or 30 msec, thus the rejection made is proper. As no further arguments were made, all dependent claims have been rejected accordingly.

Conclusion

Examiner's Note: Examiner has cited particular Figures & Reference Numbers, Columns, Paragraphs and Line Numbers in the references as applied to the claims above for the convenience of the applicant. Although the specified citations are representative of the teachings of the art and are applied to the specific limitations within the individual claim, other passages and figures may apply as well. It is respectfully requested from the applicant in preparing responses, to fully consider the references in their entirety as potentially teaching all or part of the claimed invention, as well as the context of the passage as taught by the prior art or disclosed by the examiner

Any inquiry concerning this communication or earlier communications from the examiner should be directed to RUT PATEL whose telephone number is (571)270-7924. The examiner can normally be reached on MON - THU 9:30 AM - 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Luu can be reached on (571)272-7663. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/R. P./
Examiner, Art Unit 2861

/MATTHEW LUU/
Supervisory Patent Examiner, Art Unit 2861